

AMENDMENTS TO CLAIMS

Claims 1-28 were previously canceled. Claims 29-32 were previously presented. New claims 33-44 are added.

1.-28. (Cancelled)

29. (Previously Presented) A wordline voltage control system for raising a voltage of a wordline to a predetermined voltage and maintaining the voltage of the wordline at the predetermined voltage, comprising:

a wordline extending across a portion of a non-volatile memory array; and
a charge pump connected to the wordline to deliver current from the charge pump to the wordline, the charge pump including a stage that has variable current output according to a variable capacitance in the stage, wherein the variable capacitance has a selectable first capacitor to provide a first current from the charge pump and a second capacitor to provide a second current from the charge pump, and the first capacitor is controlled by a driver circuit and the driver circuit is protected by a driver protection circuit.

30. (Previously Presented) The system of claim 29 wherein the driver circuit is an adaptive driver circuit that provides voltage to the first capacitor at a selectable voltage level.

31. (Previously Presented) The system of claim 29 wherein the second current is approximately equal to a leakage current of the wordline.

32. (Previously Presented) The system of claim 29 wherein the driver circuit is responsive to a voltage detected on the wordline.

33. (New) A charge pump connected to a wordline of a nonvolatile memory array to deliver current to the wordline, comprising:

a stage that has variable current output according to a variable capacitance in the stage, the variable capacitance having a selectable first capacitor to provide a first current from the charge pump and a second capacitor to provide a second current from the charge pump;

a first driver circuit connected to the first capacitor to provide electrical current to the first capacitor; and

a driver protection circuit connected to the first driver circuit.

34. (New) The charge pump of claim 33 wherein the first driver circuit provides electrical current to the first capacitor in a first mode and does not provide electrical current to the first capacitor in a second mode, the charge pump providing the first current in the first mode and the second current in the second mode.

35. (New) The charge pump of claim 34 wherein the second current is equal to the leakage current of the wordline.

36. (New) The charge pump of claim 35 wherein the first current is greater than the second current.

37. (New) The charge pump of claim 34 wherein the driver protection circuit comprises a transistor that regulates a voltage at an output of the first driver circuit in the second mode.

38. (New) The charge pump of claim 37 wherein the driver protection circuit further comprises a resistor connected to the transistor.

39. (New) The charge pump of claim 33 further comprising a second driver circuit connected to the second capacitor.

40. (New) The charge pump of claim 33 further comprising additional stages that provide increased voltage.

41. (New) The charge pump of claim 33 wherein the first driver circuit is an adaptive driver circuit that provides electrical current at a variable controlled voltage.

42. (New) A charge pump connected to a nonvolatile memory array, comprising:
a stage that has variable current output according to a variable capacitance in the stage, the variable capacitance having a selectable first capacitor to provide a first current from the charge pump and a second capacitor to provide a second current from the charge pump;
an adaptive driver circuit connected to the first capacitor to provide electrical current to the first capacitor at a voltage selected from a voltage range; and
a driver protection circuit connected to the first driver circuit.

43. (New) The charge pump of claim 42 wherein the adaptive driver circuit provides a first voltage in a first mode and a second voltage in a second mode, the charge pump providing a first current in the first mode and a second current in the second mode.

44. (New) The charge pump of claim 43 wherein the charge pump switches from the first mode to the second mode in response to a voltage measured in the nonvolatile memory array.